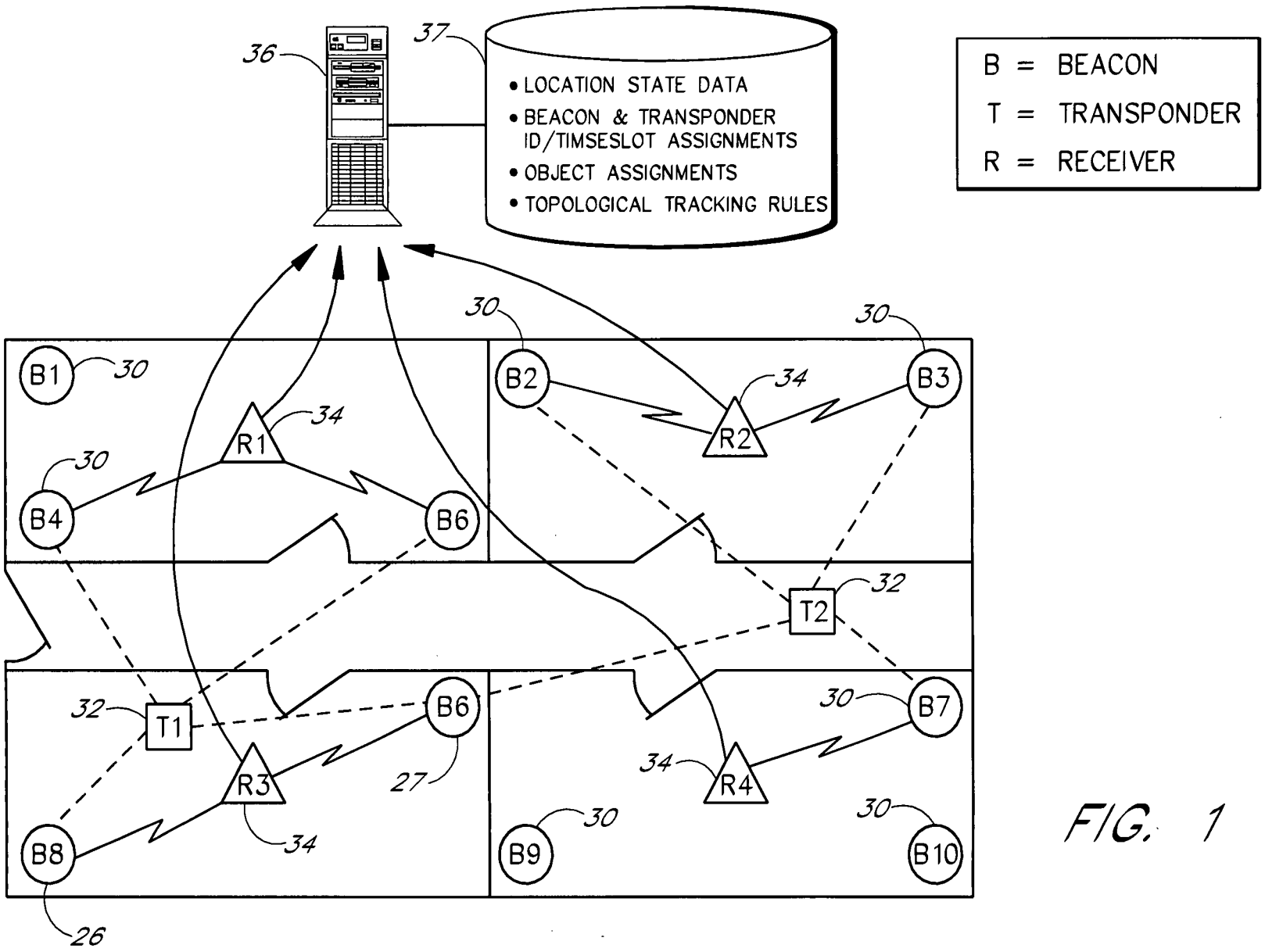
36
37
• LOCATION STATE DATA
• BEACON & TRANSPONDER ID/TIMSESLOT ASSIGNMENTS
• OBJECT ASSIGNMENTS
• TOPOLOGICAL TRACKING RULES
B = BEACON
T = TRANSPONDER
R = RECEIVER
B1
B2
B3
B4
B6
B7
B8
B9
B10
R1
R2
R3
R4
T1
T2
30
32
34
27
26

FIG. 1

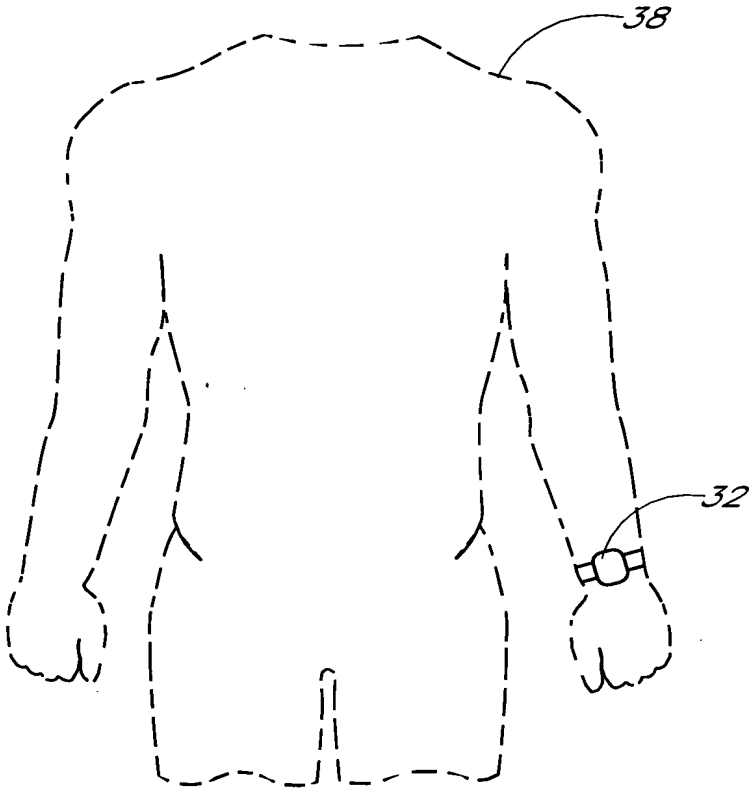

FIG. 2A

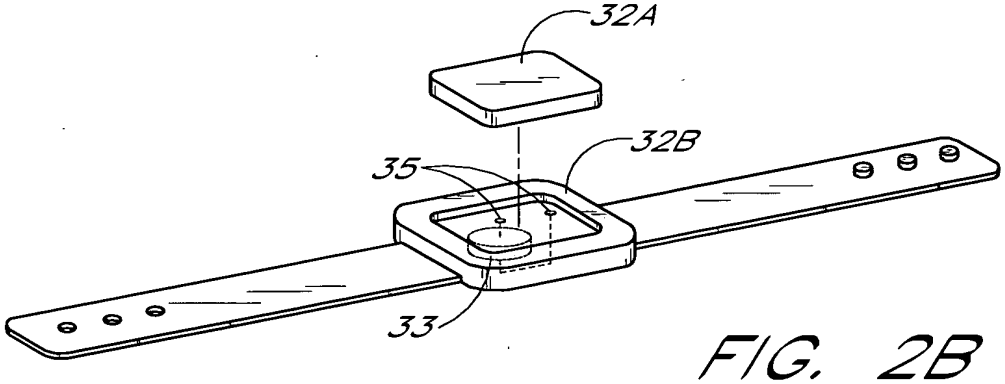

FIG. 2B

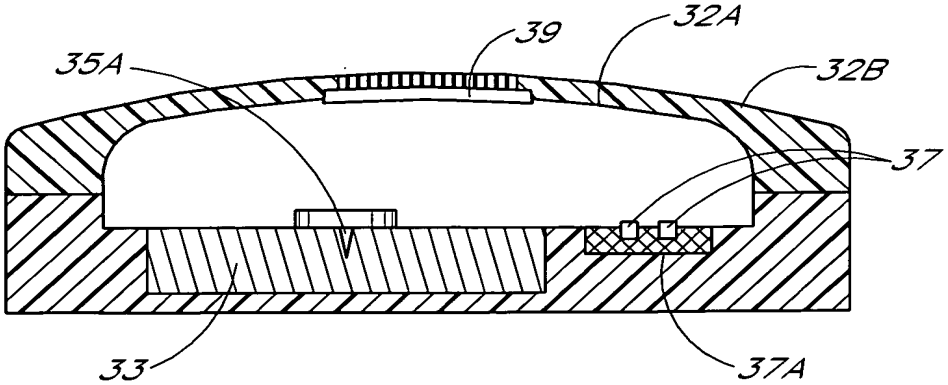

FIG. 2C

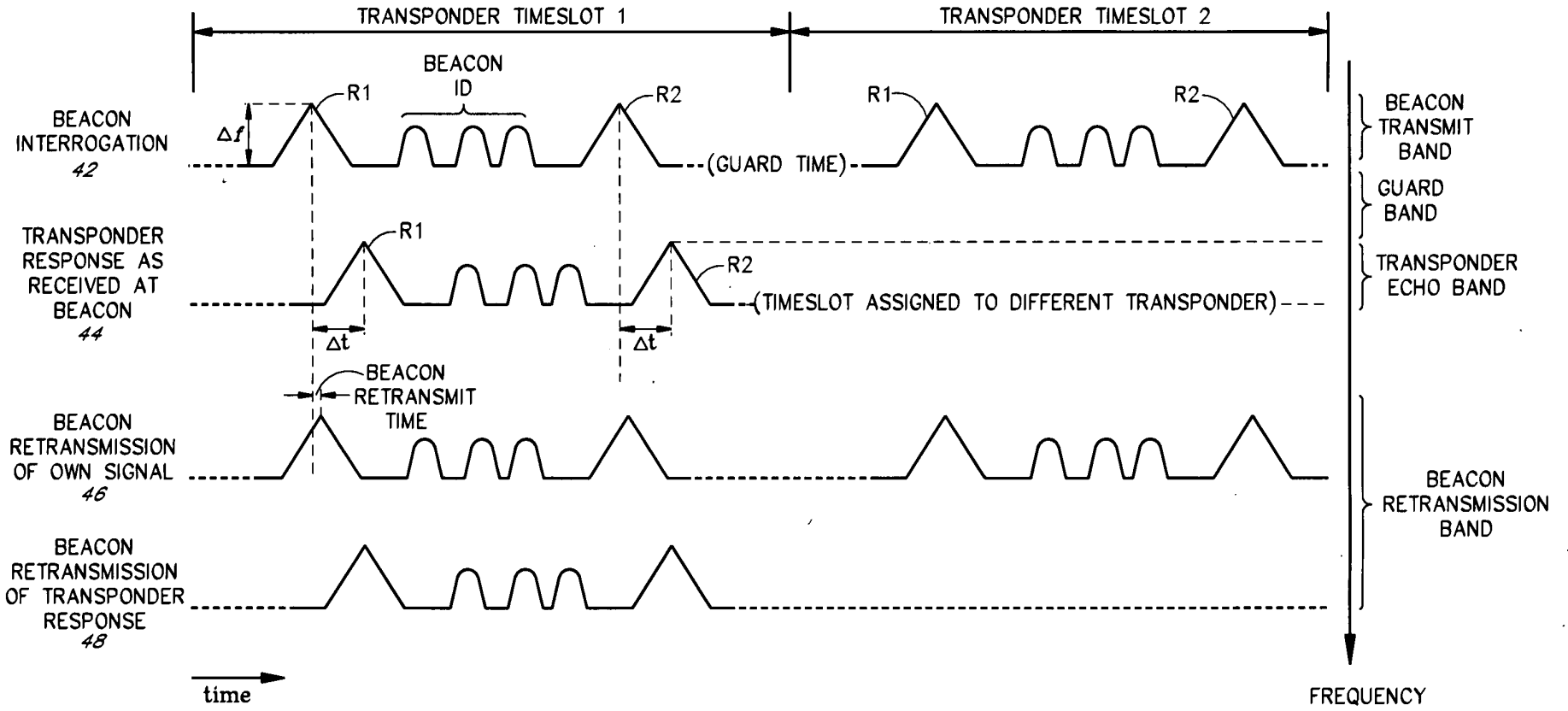

FIG. 3A

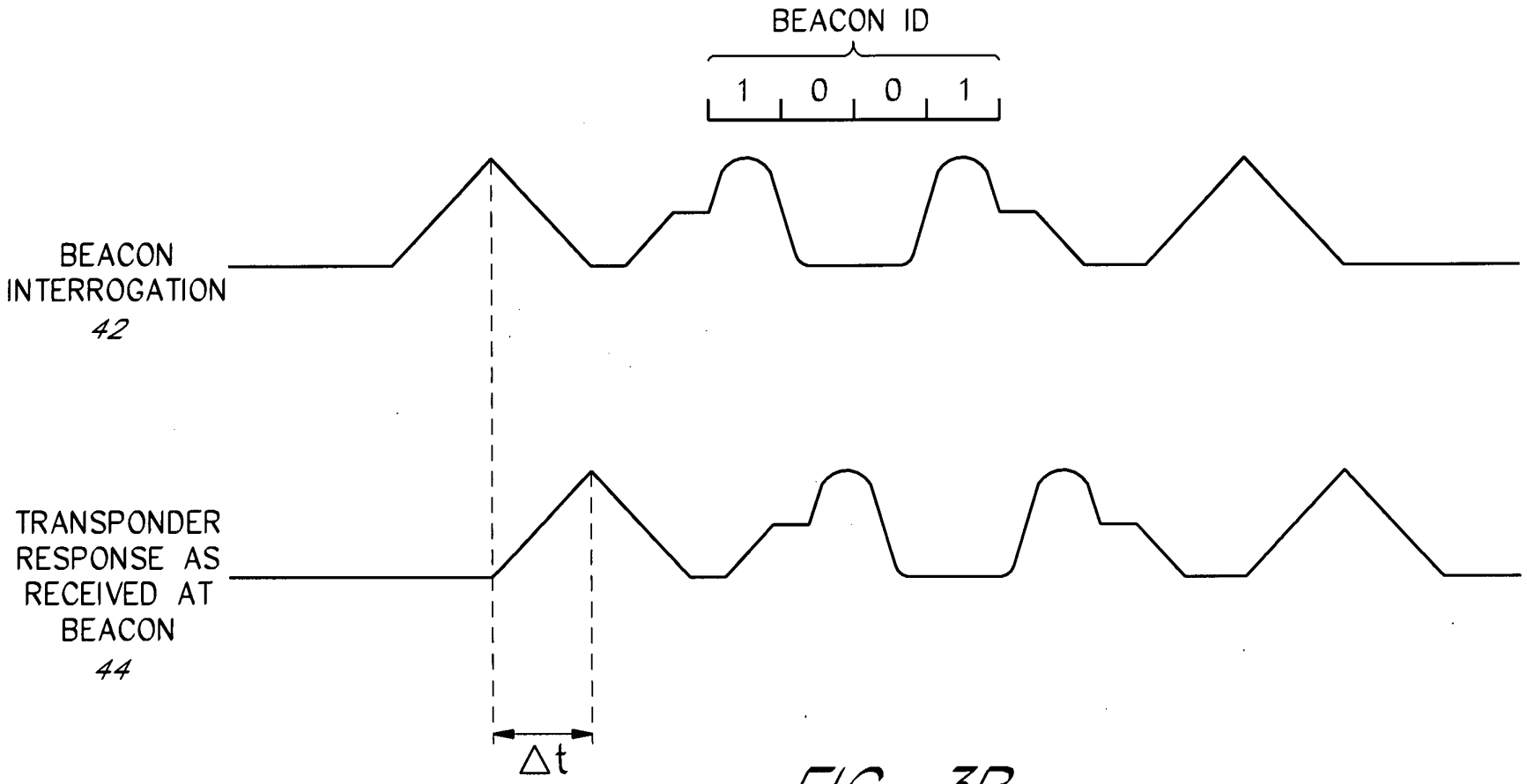

FIG. 3B

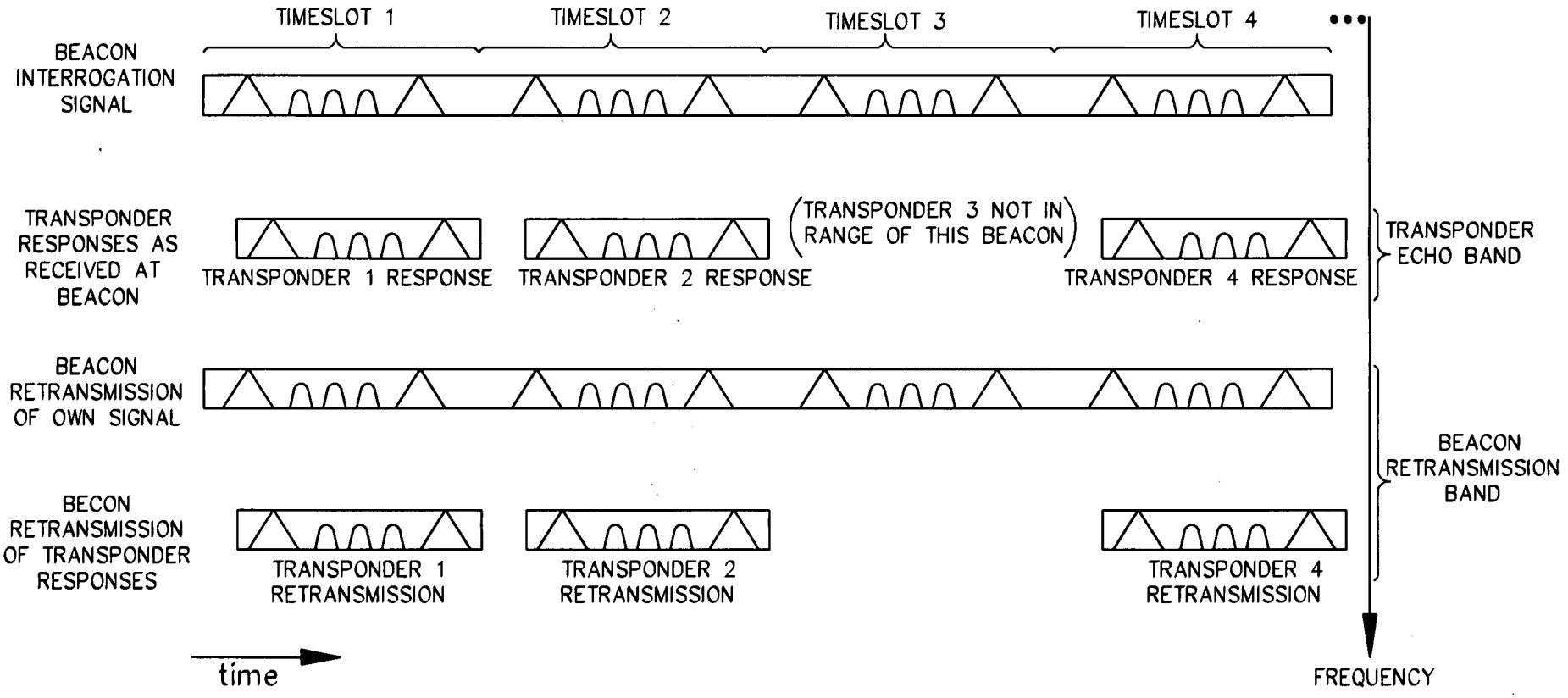

FIG. 4

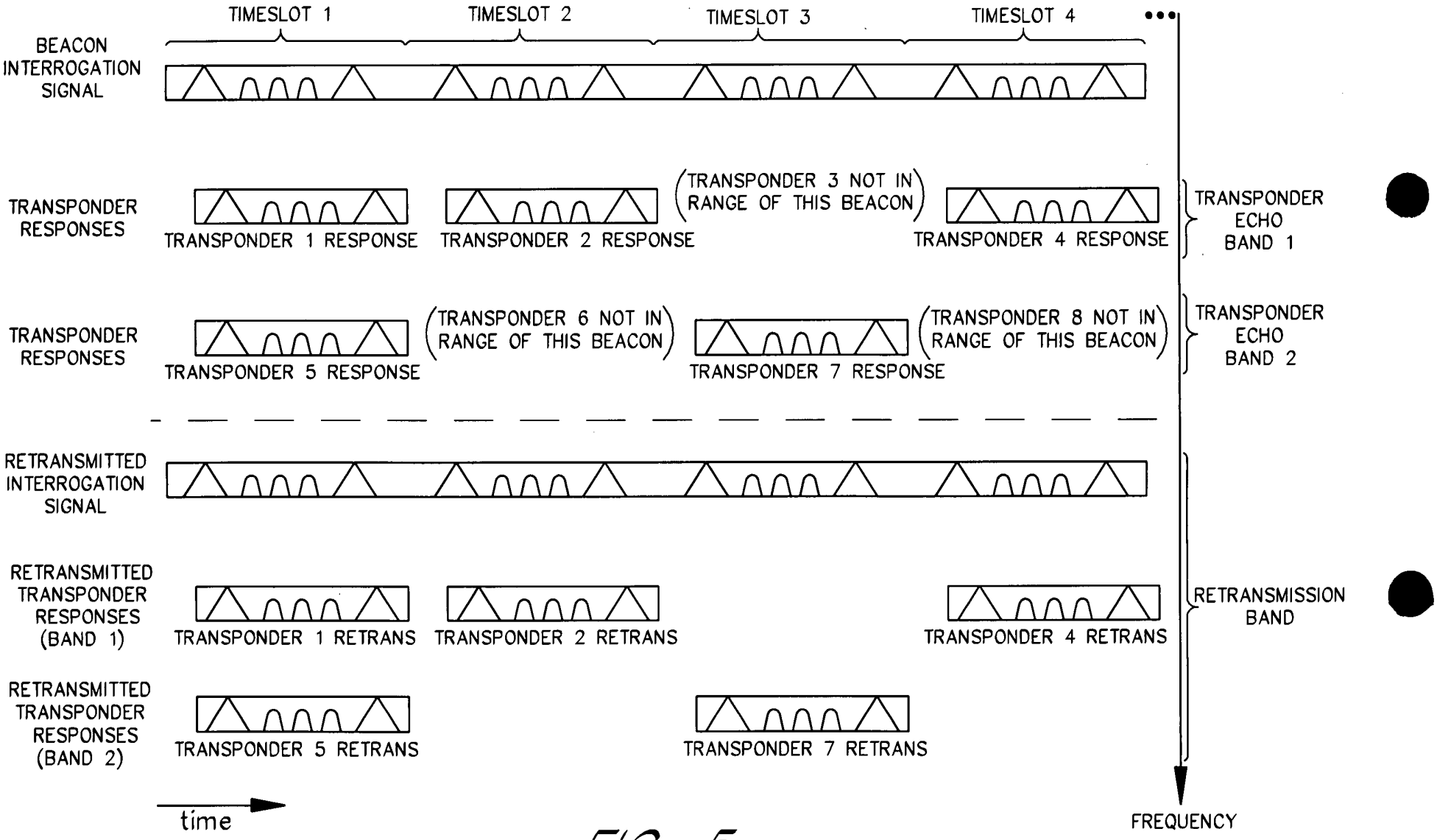
TIMESLOT 1
TIMESLOT 2
TIMESLOT 3
TIMESLOT 4
BEACON INTERROGATION SIGNAL
TRANSPONDER RESPONSES
TRANSPONDER 1 RESPONSE
TRANSPONDER 2 RESPONSE
(TRANSPONDER 3 NOT IN RANGE OF THIS BEACON)
TRANSPONDER 4 RESPONSE
TRANSPONDER ECHO BAND 1
TRANSPONDER RESPONSES
TRANSPONDER 5 RESPONSE
(TRANSPONDER 6 NOT IN RANGE OF THIS BEACON)
TRANSPONDER 7 RESPONSE
(TRANSPONDER 8 NOT IN RANGE OF THIS BEACON)
TRANSPONDER ECHO BAND 2
RETRANSMITTED INTERROGATION SIGNAL
RETRANSMITTED TRANSPONDER RESPONSES (BAND 1)
TRANSPONDER 1 RETRANS
TRANSPONDER 2 RETRANS
TRANSPONDER 4 RETRANS
RETRANSMISSION BAND
RETRANSMITTED TRANSPONDER RESPONSES (BAND 2)
TRANSPONDER 5 RETRANS
TRANSPONDER 7 RETRANS
time
FREQUENCY

FIG. 5

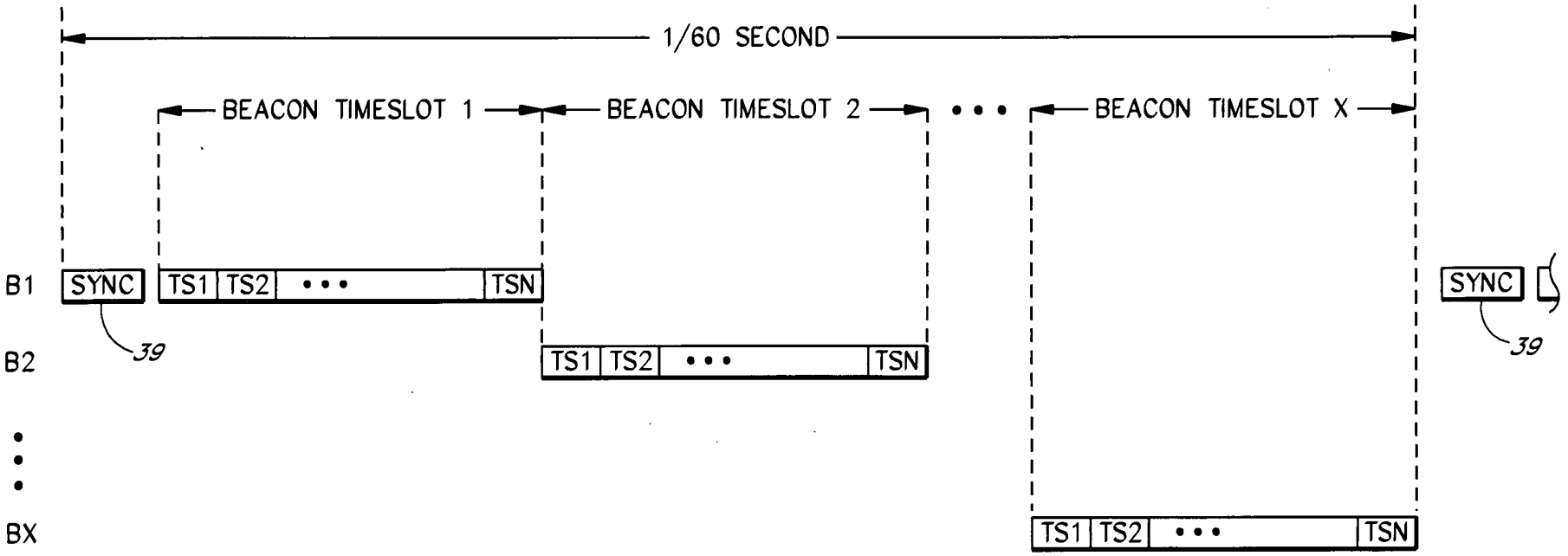
1/60 SECOND
BEACON TIMESLOT 1
BEACON TIMESLOT 2
BEACON TIMESLOT X
B1
B2
BX
SYNC
TS1
TS2
TSN
39

FIG. 6

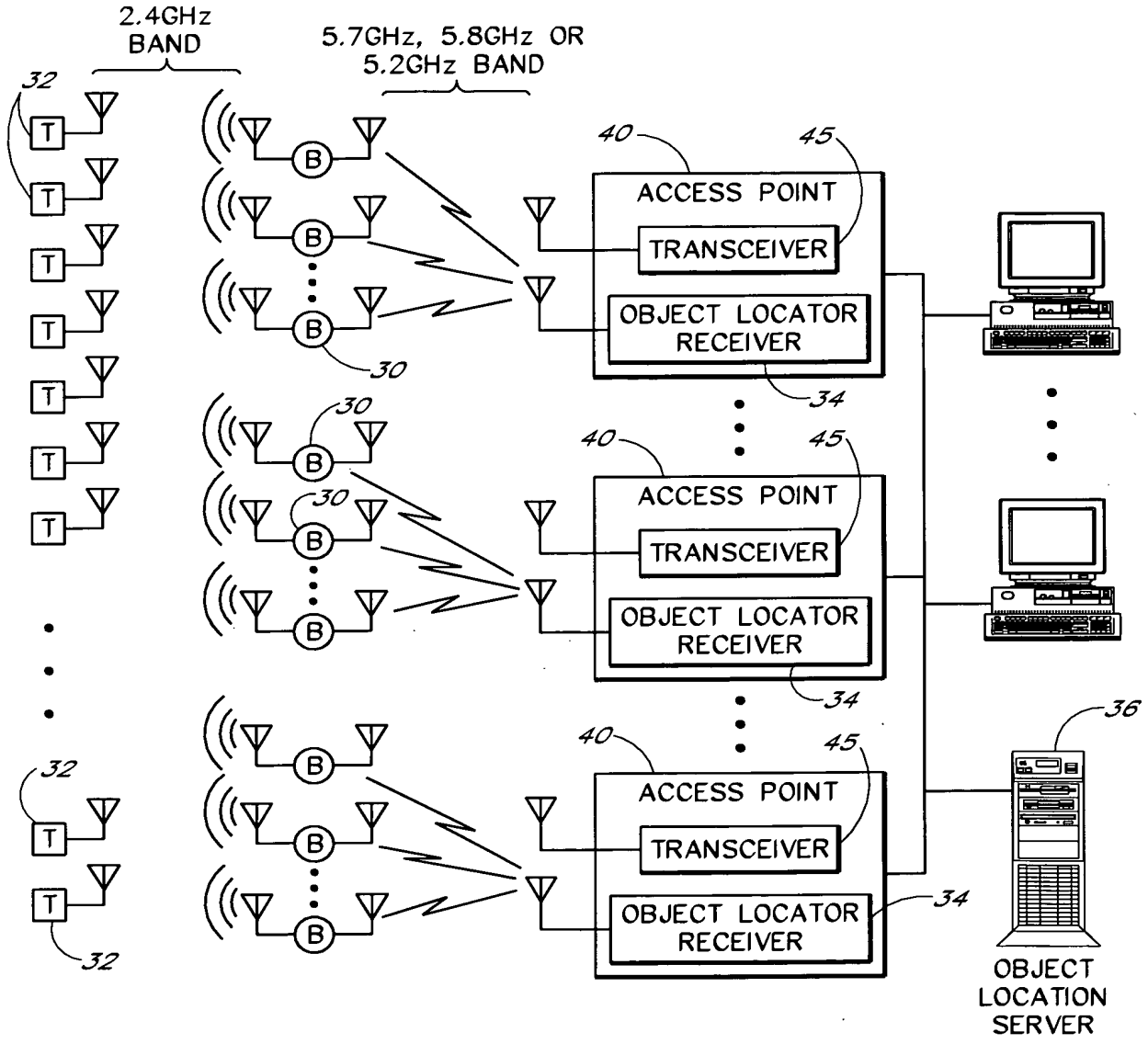
2.4GHz
BAND
5.7GHz, 5.8GHz OR
5.2GHz BAND
32
T
B
30
40
45
ACCESS POINT
TRANSCEIVER
OBJECT LOCATOR
RECEIVER
34
36
OBJECT
LOCATION
SERVER

FIG. 7

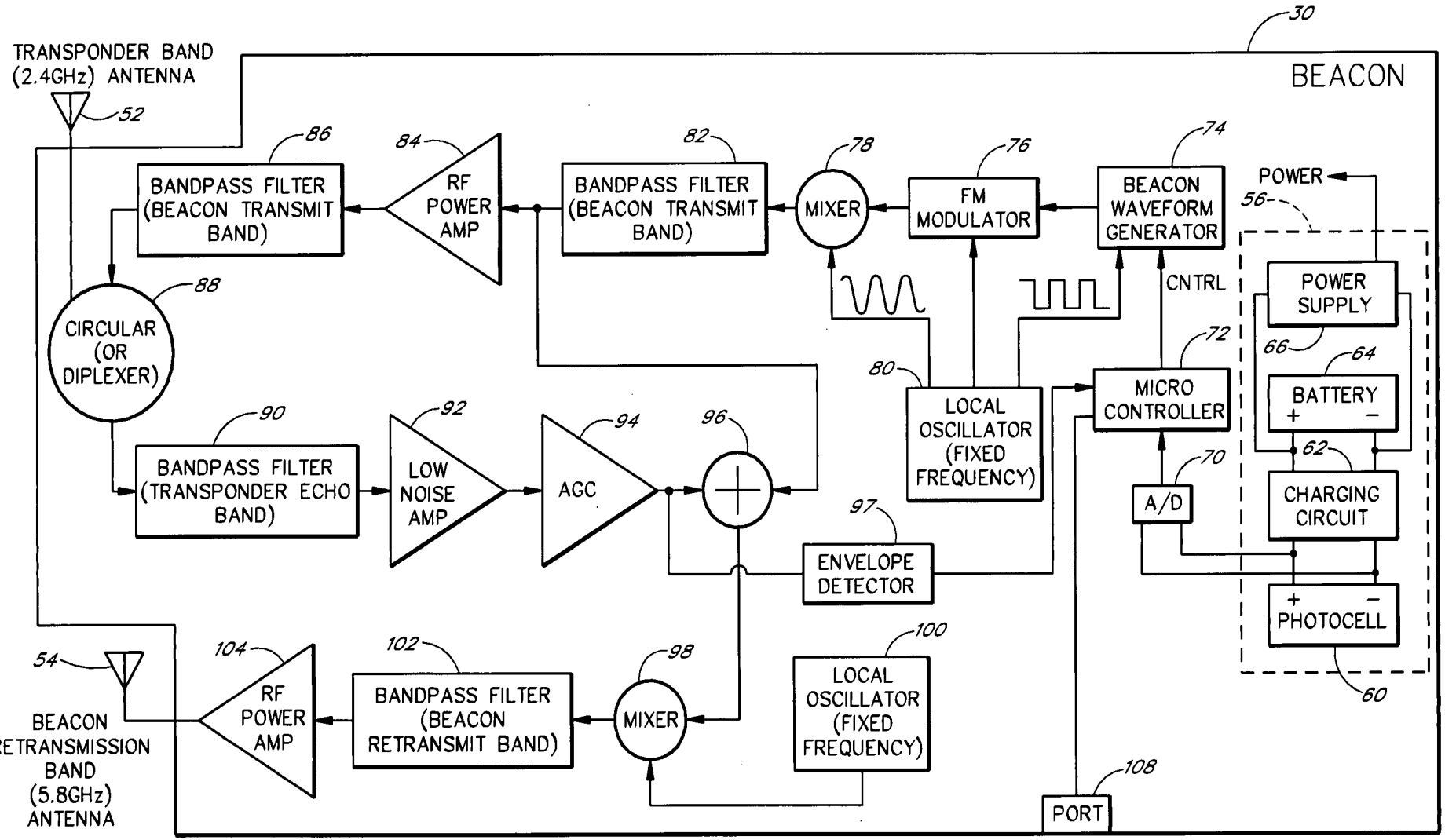
30
BEACON
TRANSPONDER BAND (2.4GHz) ANTENNA
52
86
BANDPASS FILTER (BEACON TRANSMIT BAND)
84
RF POWER AMP
82
BANDPASS FILTER (BEACON TRANSMIT BAND)
78
MIXER
76
FM MODULATOR
74
BEACON WAVEFORM GENERATOR
POWER
56
CNTRL
88
CIRCULAR (OR DIPLEXER)
90
BANDPASS FILTER (TRANSPONDER ECHO BAND)
92
LOW NOISE AMP
94
AGC
96
80
LOCAL OSCILLATOR (FIXED FREQUENCY)
72
MICRO CONTROLLER
POWER SUPPLY
66
64
BATTERY + −
62
70
A/D
CHARGING CIRCUIT
97
ENVELOPE DETECTOR
+ −
PHOTOCELL
60
54
BEACON RETRANSMISSION BAND (5.8GHz) ANTENNA
104
RF POWER AMP
102
BANDPASS FILTER (BEACON RETRANSMIT BAND)
98
MIXER
100
LOCAL OSCILLATOR (FIXED FREQUENCY)
108
PORT

FIG. 8

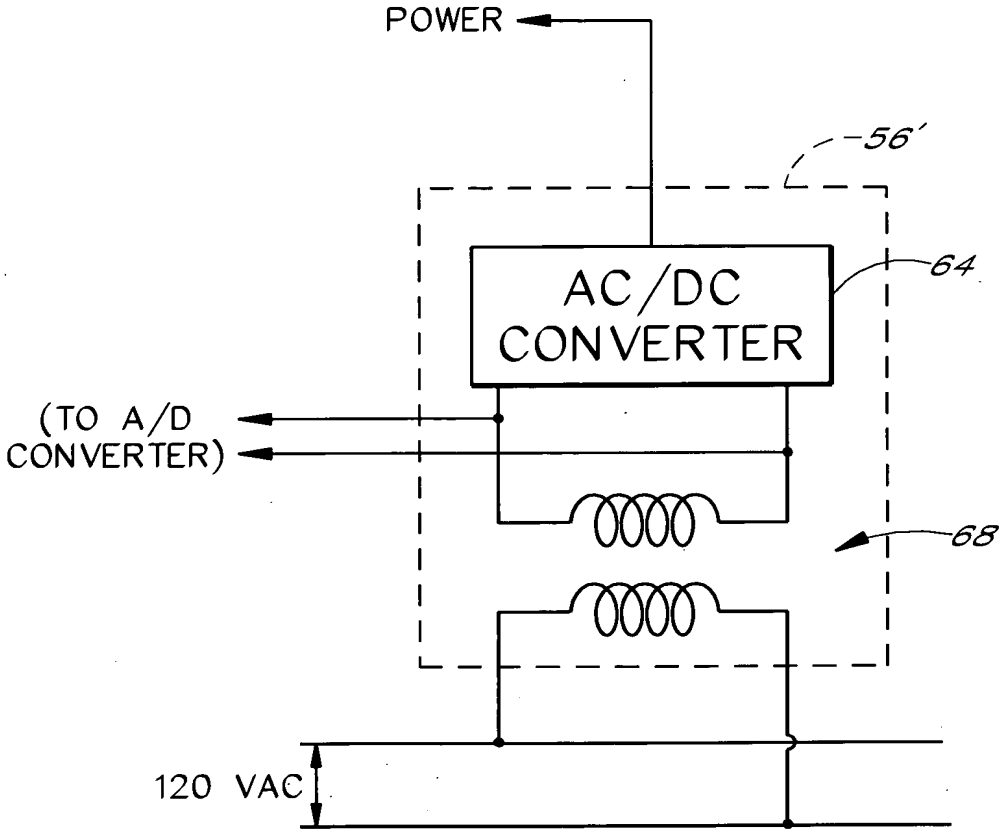

FIG. 9

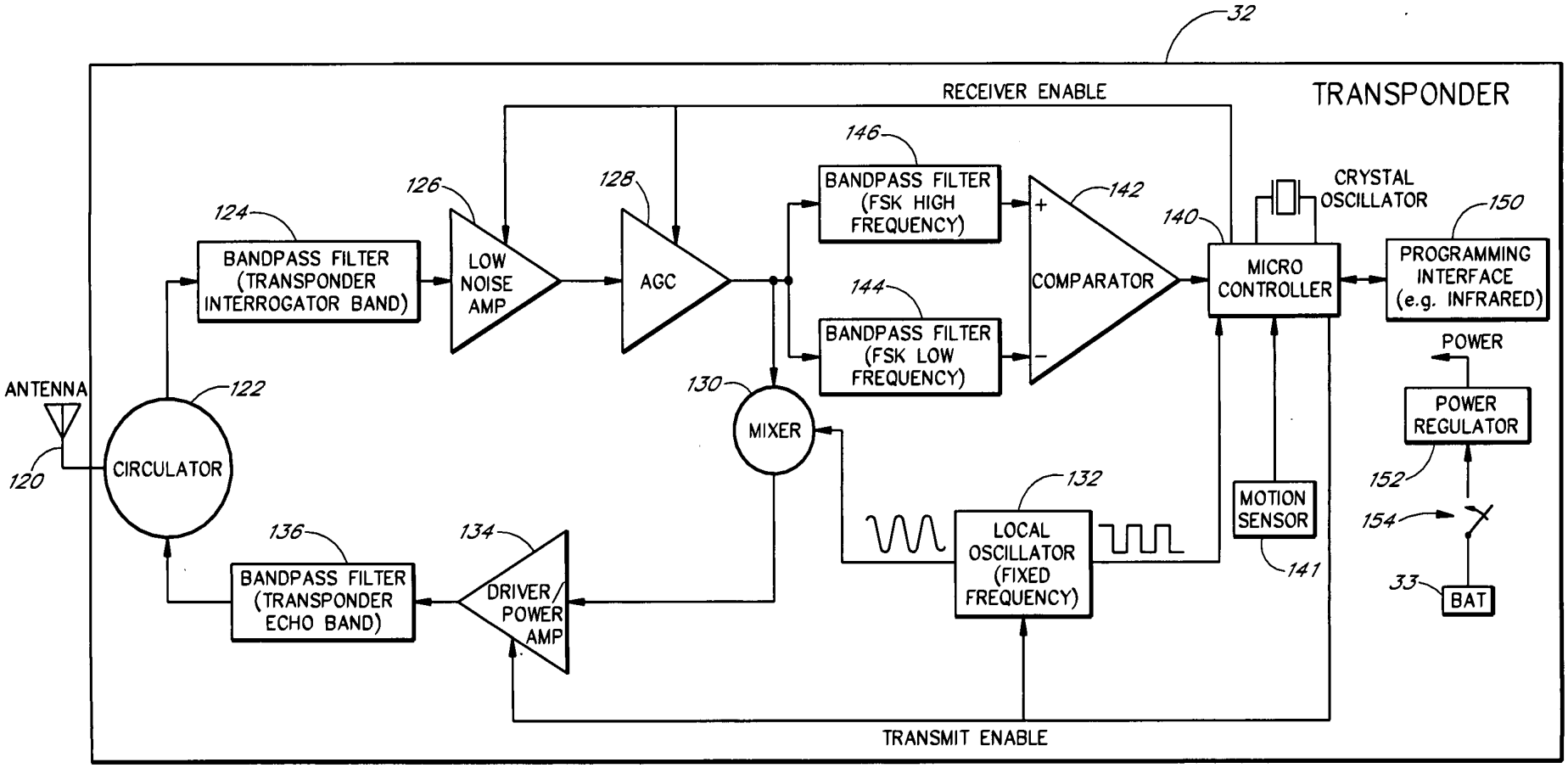

FIG. 10

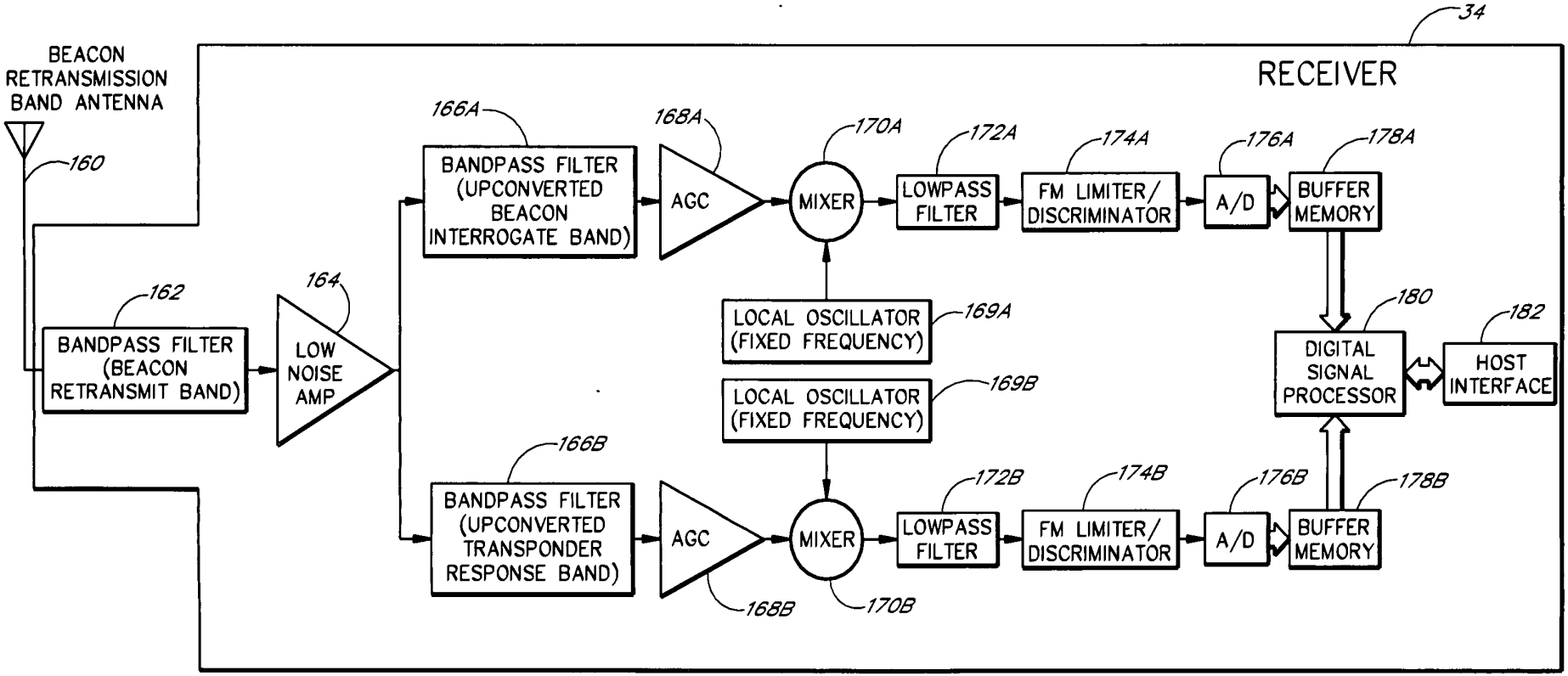
34
RECEIVER
BEACON RETRANSMISSION BAND ANTENNA
160
162
BANDPASS FILTER (BEACON RETRANSMIT BAND)
164
LOW NOISE AMP
166A
BANDPASS FILTER (UPCONVERTED BEACON INTERROGATE BAND)
168A
AGC
170A
MIXER
172A
LOWPASS FILTER
174A
FM LIMITER/ DISCRIMINATOR
176A
A/D
178A
BUFFER MEMORY
169A
LOCAL OSCILLATOR (FIXED FREQUENCY)
169B
LOCAL OSCILLATOR (FIXED FREQUENCY)
166B
BANDPASS FILTER (UPCONVERTED TRANSPONDER RESPONSE BAND)
168B
AGC
170B
MIXER
172B
LOWPASS FILTER
174B
FM LIMITER/ DISCRIMINATOR
176B
A/D
178B
BUFFER MEMORY
180
DIGITAL SIGNAL PROCESSOR
182
HOST INTERFACE

FIG. 11

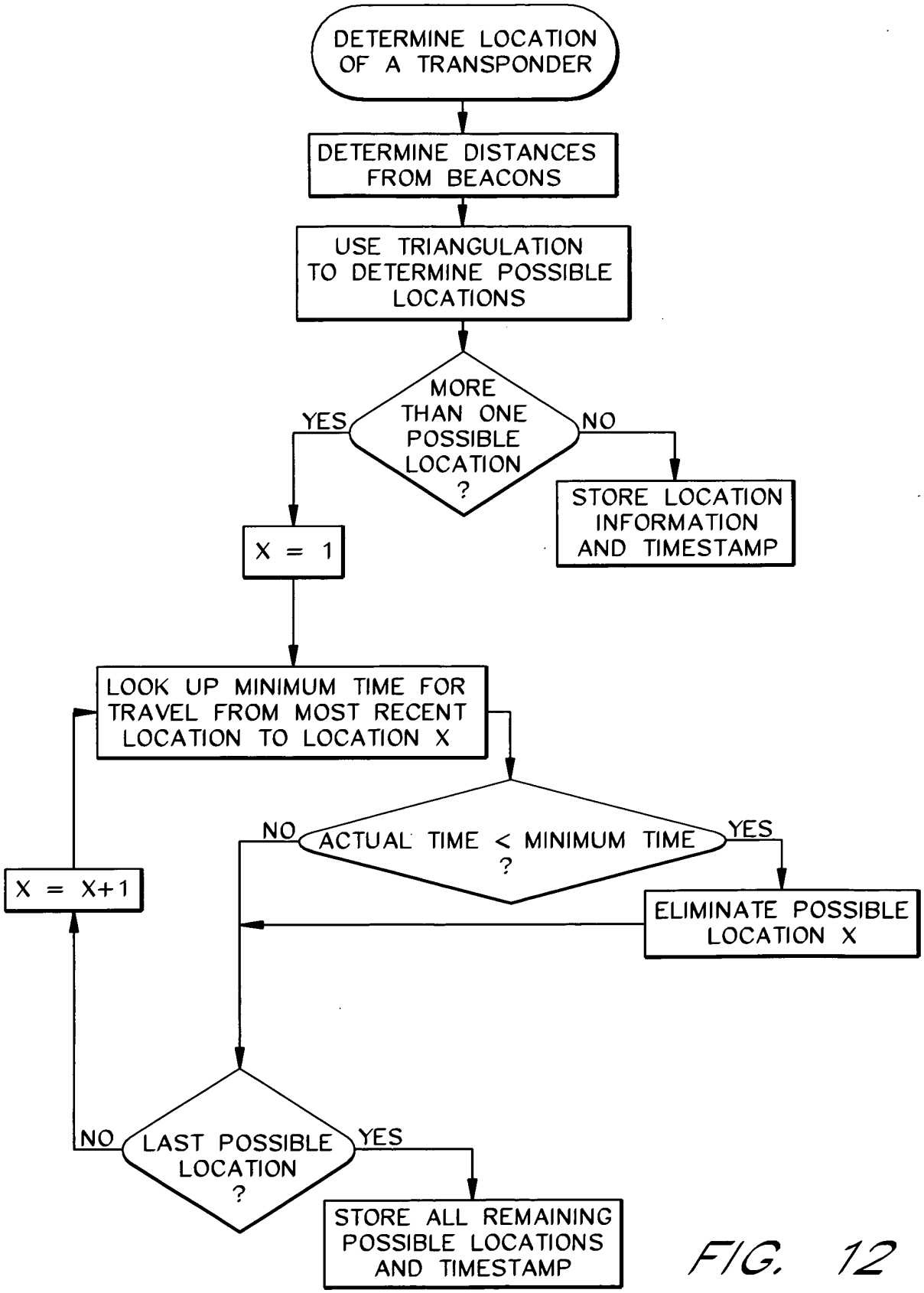
DETERMINE LOCATION OF A TRANSPONDER
DETERMINE DISTANCES FROM BEACONS
USE TRIANGULATION TO DETERMINE POSSIBLE LOCATIONS
MORE THAN ONE POSSIBLE LOCATION ?
YES
NO
STORE LOCATION INFORMATION AND TIMESTAMP
X = 1
LOOK UP MINIMUM TIME FOR TRAVEL FROM MOST RECENT LOCATION TO LOCATION X
ACTUAL TIME < MINIMUM TIME ?
NO
YES
ELIMINATE POSSIBLE LOCATION X
X = X+1
LAST POSSIBLE LOCATION ?
NO
YES
STORE ALL REMAINING POSSIBLE LOCATIONS AND TIMESTAMP

FIG. 12